

neighboring pixels being utilized for an interpolation of each pixel in order to reduce the effects of noise (col. 9, lines 25-55).

Therefore, it would have been obvious to a person of ordinary skill in the relevant art employing a method for generating an image when estimating a motion of image sequences as taught by ZIEGLER to incorporate the well known concept of aliasing reducing interpolation filtering, and more than four neighboring pixels being utilized for an interpolation of each pixel as taught by Thomas in order to reduce the effects of noise.

Three basic criteria must be met to establish a *prima facie* case of obviousness.

First, the prior art references must teach or suggest all the claim limitations. Second, the references or the knowledge generally available to one of ordinary skill in the art must provide some suggestion or motivation to modify the reference or to combine reference teachings. Third, there must be a reasonable expectation of success. M.P.E.P. § 2143.

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959); MPEP 2143.01.

First, the Ziegler reference does not teach or suggest all the claim limitations of Claim 6. For example, as noted by the Office, "ZIEGLER does not specifically disclose utilizing aliasing reducing interpolation filtering, and more than four neighboring pixels being utilized for an interpolation of each pixel." Second, there is no suggestion or motivation in the Ziegler reference or in the knowledge generally available to one of ordinary skill in the art to modify the Ziegler reference to achieve the subject matter of Claim 6. In fact, the Ziegler reference teaches away from the subject matter of Claim 6. According to the Ziegler reference:

[T]here are two principle procedures which allow to get vectors with subpixel accuracy: a nonlinear interpolation of the correlation surface function or a special kind of block-matching which takes the calculated motion vectors with pixel accuracy and refines them (Fig. 3). (Ziegler, §4.1)

The Ziegler reference also describes several disadvantages of nonlinear interpolation, including the necessity to inspect a lot more of candidate vectors than with bilinear interpolation, and the necessity to fix the accuracy at the moment the computation starts. (Ziegler, §4.2) The Ziegler reference further states:

To avoid the disadvantages of an nonlinear interpolation, it is better to use another method. Proceeding on the assumption that the motion vectors are already calculated as described in section 3, it is useful to refine these vectors. A very promising method is blockmatching using N steps and reducing the step-range to $1/2^N$ this way. (Ziegler, §4.3, *emphasis added*).

The advantages of this procedure compared to a nonlinear interpolation are quite obvious. First it is possible to decide whether an accuracy of $1/2^N$ is enough, or whether it should be refined to $1/2^{N+1}$. So the accuracy may be dependent on a measurement of the obtained quality... The second advantage is that the quality from one step to the next one remains equal in the worst case or increases, but never gets worse. That is not supposed in a nonlinear interpolation system, as shown in section 4.2. (Ziegler, §4.3)

Thus, Ziegler directly teaches away from using the techniques of a nonlinear interpolation system. Additionally, employing techniques of such a system would introduce disadvantages that Ziegler teaches to improve. Furthermore, according to Ziegler, such techniques may reduce the quality of its system.

The Thomas reference discloses a system to derive a correlation surface by phase-correlating two pictures using a nonlinear interpolation. (Abstract; col. 9, l. 1 – col. 13, l. 12). The Thomas reference identifies errors with its system, including:

[T]he motion vector of parts of the gate are sometimes assigned incorrectly (despite the fiddle factor described earlier), and the spatial filter on the error surface can cause the edges of objects (or adjacent background) to appear slightly corrupted. (Thomas, col. 11, ll. 33-37)

Thomas also states:

The output pictures were slightly soft, partially due to insufficient vertical detail being available in the input pictures (as only odd fields were used) and partly due to the simplistic spatial interpolator used when applying motion vectors with non-integer components. (Thomas, col. 11, ll. 17-22).

Thus, the Thomas reference discloses a system that the Ziegler reference teaches to avoid. Furthermore, modifying the Ziegler system with the teachings of the Thomas reference would not only depart from the original principle of operation of the Ziegler system, but it would also render the Ziegler system unsatisfactory for its original

intended purpose. Thus, there is no motivation to modify the Ziegler reference in view of the Thomas reference to achieve the invention recited in Claim 6.

For the foregoing reasons, the combination of the Ziegler reference and the Thomas reference does not render Claim 6 or its dependent Claims 7-10 and 12 obvious under 35 U.S.C. §103(a), and it is respectfully submitted that Claims 6-10 and 12 are allowable over the Ziegler reference in view of the Thomas reference.

Claim 11 stands rejected under 35 U.S.C. §103(a) as being unpatentable over the Ziegler reference and the Thomas reference in view of United States Patent No. 5,991,447 to Eifrig et al. ("the Eifrig reference").

According to the Office Action:

[T]he combination of ZIEGLER and Thomas does not particularly disclose predicting video objects separately, and inserting coefficients into a transmission bit stream at a beginning.

However, Eifrig et al teaches predicting video objects separately (Abs.), and inserting coefficients into a transmission bit stream (140) at a beginning in order to achieve efficient coding, object scalability, spatial and temporal scalability, and less error.

Therefore, it would have been obvious to a person of ordinary skill in the relevant art employing a method for generating an image when estimating a motion of image sequences as taught by ZIEGLER to incorporate the well known concept of predicting video objects separately, and inserting coefficients into a transmission bit stream at a beginning as taught by Eifrig et al in order to achieve efficient coding, object scalability, spatial and temporal scalability, and less error.

Claim 11 depends from Claim 6. As described above, the Thomas reference discloses a system that the Ziegler reference teaches to avoid. Additionally, modifying the Ziegler system with the Thomas reference would not only depart from the principle of operation of the Ziegler system, but it would render the Ziegler system unsatisfactory for its original intended purpose. Furthermore, the Eifrig reference discloses a method and apparatus for coding digital video images, e.g., current image in a bi-directionally predicted video object plane, in particular where the current image and/or a reference image used to code the current image is interlaced coded. (Eifrig, col. 2, ll. 16-22). However, there is no motivation to combine the Ziegler and Thomas references with the Eifrig reference, and the Office Action has not articulated such a motivation. Since there is no motivation to modify the Ziegler reference in view of the Thomas reference, much less a motivation to modify the two together in view of the Eifrig reference, these three references can not render Claim 11

obvious under 35 U.S.C. §103(a). Therefore, Applicant respectfully requests that this rejection be withdrawn.

CONCLUSION

In light of the foregoing, Applicant respectfully submits that all of the pending claims are in condition for allowance. Prompt reconsideration and allowance of the present application are therefore earnestly solicited.

Respectfully Submitted,

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